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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/009,339	03/20/2002	Bernhard Wirnitzer	016915-0254	3886

22428 7590 10/19/2005	EXAMINER
FOLEY AND LARDNER LLP	KANG, ROBERT N

SUITE 500	ART UNIT	PAPER NUMBER
3000 K STREET NW	2622	

WASHINGTON, DC 20007

DATE MAILED: 10/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
	10/009,339	WIRNITZER ET AL.
Office Action Summary	Examiner	Art Unit	
	Robert N. Kang	2622	_RNK_

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL.**   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-17_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-17_ is/are rejected.

7)☒ Claim(s) _9_ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _20 March 2002_ is/are: a)☐ accepted or b)☒ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All   b)☐ Some * c)☐ None of:

      1.☒ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Examiner's Note: The claims in this application have been amended by the applicant.
A complete and final copy of all claims in sequential order, without additional
amendments or changes, consistent with the changes as stated in the preliminary
amendment received 12/10/2001, must be enclosed with the response to this action.

Drawings

1.   The drawings are objected to because figure 1 uses the German terms "null" and
"eins" instead of 0 and 1, respectively. Corrected drawing sheets in compliance with 37
CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the
application. Any amended replacement drawing sheet should include all of the figures
appearing on the immediate prior version of the sheet, even if only one figure is being
amended. The figure or figure number of an amended drawing should not be labeled as
"amended." If a drawing figure is to be canceled, the appropriate figure must be
removed from the replacement sheet, and where necessary, the remaining figures must
be renumbered and appropriate changes made to the brief description of the several
views of the drawings for consistency. Additional replacement sheets may be necessary
to show the renumbering of the remaining figures. Each drawing sheet submitted after
the filing date of an application must be labeled in the top margin as either
"Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are
not accepted by the examiner, the applicant will be notified and informed of any required
corrective action in the next Office action. The objection to the drawings will not be held
in abeyance.

2.	The drawings, specifically figure 5, is objected to under 37 CFR 1.83(a) because it fails to show labels for any of the numbered blocks as described in the specification. The numerals 12-18 should have meaningful English labels on the figure itself to give the reader an idea of what the figure is depicting without constant referral to the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3.   The disclosure is objected to because of the following informalities: on page 8,

line 8, there is a typo. The examiner believes the line should read "overscanning by a

factor of 1 to 2 has proved to be advantageous." Additionally, on page 10, paragraph 4,

the disclosure compares patterns in figures 4 and 5. There are no patterns depicted in

figure 5. Examiner believes this should be a comparison between figures 3 and 4.

      Appropriate correction is required.

Claim Objections

4.   Claim 9 objected to because of the following informalities: The claim is

grammatically incorrect and confusing as currently written. There should not be a

delimiting comma between "recognized" and "information-carrying patterns" in line 2.

Additionally it is unclear what is being compared and what is being adjusted in lines 3

and 4. The examiner assumes the information carrying patterns are compared to the

defined cells to adjust the search pattern. Appropriate correction is required.

Claim Rejections - 35 USC § 103

5.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

6.   Claims 1-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Tow (US-PAT 5,315,098) in view of Pastor (US-PAT 5,170,044) further in view of

Gonzales.

With regards to claims 1 and 8, Tow discloses in column 2, lines 44-48, "methods

and means for encoding digital data in the angular orientation of circularly symmetric

halftone dot patterns that are written into the halftone cells of digital halftone images."

Tow further describes in column 4, line 2, "the human eye has limited high frequency

resolution and limited grayscale acuity, so the truncation of the grayscale range and

reduced grayscale resolution may fall below the perceptual threshold of casual

observers who views the halftone image." Therefore, Tow discloses a method and

means for "coding data having high density," wherein "the patterns are of such

dimensions that they cannot be resolved by the human eye."

Tow does not expressly disclose "the printed area of the data strip being divided

into cells and one of at least two different patterns having a characteristic, predefined

shape being respectively printed in a two-dimensional cell having a predefined shape."

Pastor discloses in column 2, lines 8-19, "a method for representing binary data

by the steps of, first providing first and second representations, each comprising three

by three arrays of cells, the first representation having the center and four corner cells

asserted and the four edge cells not asserted, and the second representation being the

complement of the first representation." Therefore, each printed area of the data strip is

divided into a two dimensional cell comprising a 3x3 matrix having a characteristic,

predefined shape.

Pastor and Tow both do not specifically disclose the use of "search patterns at defined locations for comparison with the information carrying patterns used."

Gonzales in section 9.3 discloses a method of matching by correlation. Equation 9.3-7 indicates a discrete-time convolution which results in the correlation between two images. Gonzales describes the application of this theory in page 584-585, paragraph 4. Gonzales states "Fig. 9.9 illustrates the concepts just discussed. Figure 9.9(a) is *f(x,y)*, and Fig. 9.9(b) is *w(x,y)*. The correlation coefficient $\gamma(s,t)$ is shown as an image in Fig. 9.9(c). Note the higher value (intensity) of $\gamma(s,t)$ in the position where the best match between *f(x,y)* and *w(x,y)* was found." Therefore the use of "search patterns at defined locations" is a simple and obvious application of the use of training data for pattern and template matching using correlation as taught by Gonzales to those of normal skill in the art. Gonzales further continues to describe several decision-theoretic and structural methods of pattern and template matching in sections 9.3 and 9.4. These methods were well known within the art at the time of invention.

Tow, Pastor, and Gonzales, are combinable because they are from the field of image processing. Furthermore, Tow and Pastor pertain specifically to encoding digital data in an image such as a bar code; Pastor and Gonzales pertain specifically to binary image processing. Finally, both Tow and Pastor require a method of synchronization for their disclosed encoding systems, and Gonzales expressly discloses a method of image synchronization by template matching.

Therefore it would have been obvious at the time of invention to one of normal skill in the art to include in Tow's system of encoding digital data within a human visible

image Pastor's cell-matrix binary data encoding system, further utilizing Gonzales's

correlation pattern matching algorithm and training data.

The motivation for this modification would be to increase the amount of data to

be stored within a human visible image without the use of extremely sensitive and

expensive scanning equipment.

Thus it would have been obvious to combine Tow, Pastor, and Gonzales to

obtain the invention as well as the process as disclosed in claims 1 and 8, respectively.

This combination shall be herein referred to as the Tow/Pastor/Gonzales combination,

and used in all the following claim rejections.

In regards to claim 2, Pastor depicts in figure 4 two 3x3 print patterns, 50 and 52,

wherein in pattern 50 the center and corner cells of the matrix are printed, and in pattern

52, only the edge cells are printed. Additionally, while figure 4 shows single dots printed

and not the entire cell, thus the printed and unprinted areas are not technically

exchanged, in figures 2, 5, and 6, Pastor depicts a representation of the printed patterns

wherein each cell is entirely filled in. Therefore, "the patterns differ from one another in

that the printed area is exchanged for the unprinted area.'

With regards to claims 3 and 11, examiner asserts that these claims, one

pertaining to the data strip and one pertaining to the process, are identical. Claim 3

states "within the data cell the printed area equals substantially the printed area," and

claim 11 states " within cells printed and unprinted areas of about the same size are

used." If the printed and unprinted areas are roughly the same size, they are

substantially equal. Again examiner refers to figure 4 of Pastor, wherein each pattern

shows either 4 or 5 cells printed and 5 or 4 cells unprinted, respectively. Therefore the

printed and unprinted areas are "substantially equal."

Regarding claims 4 and 12, requiring that "the patterns are characterized by

geometrical configuration or distribution of brightness," Pastor depicts in figure 50 and

52 two patterns which differ only by geometric distribution, and are thus "characterized"

by the stated property.

With regards to claim 5, requiring that "more than two different patterns are used

and that each pattern codes a sequence of information bits," Tow discloses a pattern

rotator 71, disclosed in column 4, lines 52-63, "for modulating the angular orientations of

the halftone dot patterns... As shown in FIGS. 2 and 3A-3C, the angular orientations of

the halftone dot patterns are modulated by rotating the square halftone pattern cells

about their geometric centers, so up to two bit long binary values may be embedded in

the halftone images that are produced by employing dot pattern orientations...for

encoding the different values of a two bit long binary number may take." However, in

the context of the Tow/Pastor/Gonzales combination as stated in the rejection of claim

1, this rotation results in the overall matrix orientation remaining constant while the

actual dotted cells are shifted by an arbitrary amount. For example, the pattern 50

depicted in figure 4 of Pastor's disclosure, shifted counterclockwise by one cell, would

result in having the four edge cells as well as the center cell shaded. Therefore, given the two orientations for pattern 50 and the two orientations for pattern 52, there are four total patterns, capable of coding a sequence of two bits. Thus, "more than two different patterns are used and each pattern codes a sequence of information bits."

In regards to claims 6 and 14, Tow discloses in claim 1, "a system for encoding digital data in halftone images." Halftone images are, as further disclosed by Tow in column 1, lines 15-19, "a well known and widely utilized technique for imparting a grayscale appearance to dual tone renderings of variable shaded monochromatic images and to dual tone color separations of variably shaded polychromatic images." As is well known in the art, the images created by halftoning are generally "visual information which can be perceived by man." Thus, the Tow/Pastor/Gonzales system, which encodes data within a halftone image, meets the requirements for both the data strip claimed in claim 6 as well as the process claimed in claim 14.

With regards to claims 7 and 15, Tow discloses in column 2, lines 48-55, "in keeping with standard practices the sizes of these halftone dot patterns are modulated in accordance with the grayscale data sample values that are provided to define the image, so the average reflectance or transmittance of each of the halftone cells is modulated to provided to provide a more or less standard halftone rendering of the image." Therefore the data strip as disclosed in claim 7 as well as the process in claim 15 utilizes patterns wherein "the size of individual cells is varied accordingly."

Regarding claim 9, Gonzales states on page 595, paragraph 2, "the approaches

discussed in the preceding two sections are based on the use of sample patterns to

estimate certain statistical parameters of each pattern class. The minimum distance

classifier is specified completely by the mean vector of each class. Similarly, the Bayes

classifier for Gaussian populations is specified completely by the mean vector and the

covariance matrix of each class. The patterns (of known class membership) used to

estimate these parameters usually are called training patterns, and a set of such

patterns from each class is called a training set. The process by which a training set is

used to obtain decision functions is called learning or training." Therefore, Gonzales

teaches the exact method of using a training pattern (the defined cells) to produce the

training set (search patterns). Furthermore, the use of training data for synchronization

of signals has been well known in the art of both image and signal theory for decades

prior to the date of invention. Finally, in a two dimensional comparison between known

training data and a set of captured data, the "data transfer channel" as stated in the

disclosure on page 6, paragraph 2, takes into account rotation as well as tilting and

other optical distortion. Thus, the Tow/Pastor/Gonzales combination meets the

limitation of claim 9, "the position, rotation and appearance of the recognized

information carrying patterns are compared to the defined position, rotation, and form of

appearance, in order to adjust the position, rotation and form of appearance of the

search patterns."

In regards to claim 10, Pastor depicts in fig. 4 two print patterns 50 and 52. Pastor discloses in column 2, lines 8-19, "a method for representing binary data by the steps of, first providing first and second representations, each comprising three by three arrays of cells, the first representation having the center and four corner cells asserted and the four edge cells not asserted, and the second representation being the complement of the first representation." Therefore, the requirement of claim 10 that "the patterns are inverted" is met by the Tow/Pastor/Gonzales combination.

Regarding claim 13, "that patterns having at least two different colors are brought about, being coded by exchanging the color," Pastor depicts in figure 4 two complementary 3x3 matrix patterns 50 and 52. He further discloses in column 4, lines 46-50, "black pixels are assumed to represent bits having a value one and white pixels represent bits having a value zero." Therefore, there are "at least two colors," with each pattern "being coded by exchanging the color." Thus the requirement of claim 13 is met by the Tow/Pastor/Gonzales combination.

Regarding claims 16 and 17, Examiner asserts that the use of training data in any signal processing system, whether pertaining to image processing or digital communications, requires the training data be at predefined locations or in a predefined sequence, otherwise synchronization is not possible. Furthermore, training data inherently does not carry a data payload; its existence only carries synchronization information so that data transmission can occur afterwards. Therefore, claim 16,

requiring that "the patterns used for coding are positioned on the support in predefined

cells and/or predefined sequence," and claim 17, requiring that "predetermined sections

of the support are not coded by recording of parameters," are both intrinsically met by

the well known characteristics of training data.

Conclusion

7.   The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure. Schuessler (US-PAT 5,811,787) discloses a two-dimensional bar

code symbology using implicit information encoding.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Robert N. Kang whose telephone number is (571) 272-

0593. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Edward Coles can be reached on (571)272-7402. The fax phone number

for the organization where this application or proceeding is assigned is 571-273-8300.

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RNK

TWYLER LAMB
PRIMARY EXAMINER